SAMPLING AND QUALITY ASSURANCE PLAN

BAYONNE BARREL AND DRUM SITE
NEWARK, ESSEX COUNTY, NEW JERSEY

VERIFICATION OF ERCS DIOXIN SAMPLING

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1.0 BACKGROUND

The Bayonne Barrel and Drum Site (BB&D) is a former drum reconditioning facility occupying approximately 15 acres off of Raymond Boulevard in the Ironbound section of Newark, New Jersey (see Figure 1). The facility operated as an unlicensed Treatment, Storage, and Disposal facility (TSDF) from the early 1940s until the early 1980s when the company filed bankruptcy under Chapter 11. The site is bordered on the north and west by Routes 1 and 9, on the east by the New Jersey Turnpike and on the south by a movie theater.

Part of the drum reconditioning process by Bayonne Barrel & Drum included incineration of open-head drums, within site building #2. Incinerator ash, generated as a result of the unpermitted incinerator, was then staged in eight ash piles which encompass approximately 11,375 square feet in the southwest corner of the site. Incinerator ash on the floor and within six floor troughs of building #2 was removed and staged in three 30-cubic yard roll-offs.

As a result of the incineration process, the soil and ash on the site were contaminated with polychlorinated biphenyls (PCBs), polychlorinated dibenzo-p-dioxins (tetra- through octachlorinated homologues - PCDDs), and polychlorinated dibenzofurans (tetra- through octachlorinated homologues - PCDFs). The presence of such compounds are further substantiated by the existence of drums on site with generator hazardous waste labels. The labels have Resource Concservation and Recovery Act (RCRA) waste codes F001-F005 (spent halogenated solvents or non-halogenated solvents). These RCRA waste codes are potential PCDD and PCDF precursors.

2.0 PROJECT SCOPE & DATA OBJECTIVES

The EPA Removal Action Branch (RAB) has tasked the EPA Region II Technical Assistance Team (TAT) with the removal action second phase sampling and analysis at the Bayonne Barrel and Drum Site.

Based on historical information regarding operational procedures at the site and previous analysis conducted by the Emergency Response Cleanup Services (ERCS) contractor, the following three areas are of concern for the second phase of the removal action: eight ash piles at the southwest corner of the site; three 30-cubic yard roll-offs staged in front of building #2; and courtyard soils between buildings #s 1, 2, 3, and 4 (see figure 1).

The sampling objective for this phase of the project is to confirm the ERCS contractor's sampling results of ash piles #s 1, 2 and 3 and to determine if the soils beneath the former drum pile area contain dioxin through PCB, PCDD, and PCDF analyses.

3.0 QUALITY ASSURANCE OBJECTIVES

As identified in Sections 1.0 and 2.0 the objective of the project/event applies to the following parameters:

Sample Parameter/Fraction		Analytical Method Reference	Holding Time (Days)	Volume
TCL				
	VOLATILES (VOA)	SW-8240	10	2 X 120 ml
	SEMI-VOLATILES (BNA)	SW-8250	7	1 X 8 OZ.
	PCB/PEST	SW-8080	7	INCL.W/VOA
TAL				
	METALS	SW-7000 SERIES	26 (Hg only) 178	1 X 8 OZ.
	CYANIDES	SW-9012	14	INCL. W/METALS

NOTE:
1. Sample matrix is soil (low/med concentration)
2. Sample preparation methods for TCL fractions; SW-5030 (VOA) and SW-3510/3540 (BNA/PEST/PCB)
3. Sample preparation methods for TAL parameter is SW-3050 for all metals except cyanide
4. Sample preservation is cool to 4C
5. Sample QA/QC objective is level 2
6. Limit of detection is analyte-specific

4.0 SAMPLING APPROACH & METHODOLOGIES

4.1 Sampling Design

The former drum pile area is located in the southwest corner of the site. In order to accurately characterize the areas of suspected contamination, only the soils located directly beneath the three (3) drum piles will be sampled.

Three (3) transects will be delineated within the center of each former drum pile. A systematic sampling scheme with fifty foot intervals between nodes will be utilized. Based on former pile dimensions, four (4) sampling locations will be defined along each transect, with the initial sampling location for each transect being biased.

A total of twelve (12) soil samples will be taken at a depth of 6-12 inches and analyzed for full Target Compound List (TCL) and Target Analyte List (TAL) including cyanide analyses.

Additionally, one (1) duplicate soil sample, one (1) field blank and one rinsate blank will be analyzed for TCL and TAL. Triple volume will be taken at one location to include matrix spike and matrix spike duplicate analysis. These additional samples will thereby satisfy the requirements of Quality Assurance Level Two.

4.2 Sampling Equipment

Sample containers will be specially-cleaned laboratory glassware, as directed under OSWER Directive 9240.0-05: Specifications and Guidance for Obtaining Contaminant-Free Sample Containers (July 1989). The outside of the sample jars will be wiped clean using plain paper towels to prevent possible spread of contamination beyond the decontamination zone.

Sub-surface soil samples will be collected using dedicated stainless steel bucket augers, thereby necessitating the decontamination of sampling apparatus between sample locations. Decontamination procedures in the field are in accordance with EPA sampling equipment decontamination and will consist of the following:

1) Wash and scrub with low phosphate detergent;
2) Deionized water rinse;
3) 10% nitric acid rinse;
4) Hexane rinse;
5) Methanol rinse;
6) Deionized water rinse;
7) Air dry;
8) Wrap in aluminum foil, shiny side out, for transport.

4.3 Standard Operating Procedures

4.3.1 Sample Documentation

All sampling information will be completed legibly and in ink. Any mistakes that are made will be denoted by a single line to cross out the mistake and the initials of the transcriber.

4.3.1.1 FIELD LOG BOOK

The field log book details site activities and observations such that it can account for field procedures and pertinent information in the transcriber's absence. All entries will be dated and signed by the transcriber and will be maintained by the sampling contractor. The following information will be recorded:

1. Site name and project number;
2. Name(s) of personnel on-site;
3. Dates and times of all entries (military time);
4. Descriptions of all site activities, including site entry and exit times, noteworthy events and discussions, site observations;
5. Weather conditions;
6. Identification and description of samples and locations;
7. Subcontractor information and names of on-site personnel;
8. Date and time of sample collections, along with chain-of-custody information;
9. Sample locations, sampling equipment and other equipment used to make field measurements;
10. Calibration data for equipment;
11. Calculations and results;
12. Record of photographs;
13. Site sketches.

4.3.1.2 SAMPLE LABELS

Each sample will be accurately and completely identified. All labels will be moisture-resistant and able to withstand field conditions. Sample containers will be labeled prior to sample collection. The information on each label will include the following, but is not limited to:

1) Date/time of collection;
2) Sample identity/location;
3) Analysis requested;
4) Sample type (composite);
5) Sample preservation (if required).

4.3.1.3 CHAIN OF CUSTODY RECORD

EPA chain-of-custody records will be completed and maintained throughout the entire site activities as per TAT Standard Operating Procedures (SOP) on sample handling, sample container contract specifications, and EPA Laboratories SOP. The chain-of-custody form to be used lists the following information:

1) Sample number;
2) Number of sample containers;
3) Description of samples including specific location of sample collection;
4) Identity of person collecting the sample;
5) Date and time of sample collection;
6) Date and time of custody transfer to laboratory (if the sample was collected by a person other than laboratory personnel);
7) Identity of person accepting custody (if the sample was collected by a person other than the laboratory personnel);
8) Identity of laboratory performing the analysis.

4.3.1.4 CHAIN OF CUSTODY SEALS

Chain of Custody Seals demonstrate that a sample container has not been tampered with or opened.

The individual packaging the sample(s) must sign and date the seal, affixing it in such a manner that the container cannot be opened without breaking the seal. The name of this individual, along with a description of the sample packaging, must be noted in the Field Log Book.

4.3.2 SOIL SAMPLING SOP

All samples will be taken such that the soil from the appropriate depth will be removed from the sample location and homogenized in a stainless steel mixing bowl. A representative sample will be collected and transferred into an appropriately labelled sample container. See Appendix A for further reference.

4.3.3 SAMPLE HANDLING AND SHIPMENT SOP

After a sample has been collected, the sample bottle will be capped and affixed with a custody seal. Each sample will be labelled with the appropriate information (including sample number, date and time of collection, analysis requested and preservative used). All of the samples will be packaged and shipped according to the proper DOT shipping regulations. See Appendix B for further reference.

4.4 Schedule of Activities

Soil samples will be collected at the Bayonne Barrel & Drum Site on April 5, 1995 and will be driven to the laboratory for analysis later that day.

5.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

The EPA On-Scene Coordinator (OSC), Joe Cosentino, or his designated alternate will provide EPA TAT Region II Contractor, Roy F. Weston, Inc. concerning project sampling needs, objectives, and schedules.

The TAT Project Manager, Heidemarie Adenau, is the primary point of contact with the EPA OSC. The project manager is responsible for the development and completion of the Sampling QA/QC Plan, project team organization, and supervision of all project tasks, including reporting and deliverables.

The TAT Sample Management Officer/Site QC Coordinator, Bartt Booz, is responsible for ensuring field adherence to the Sampling QA/QC Plan and recording any deviations from the plan.

The TAT Analytical Coordinator, Smita Sumbaly, is responsible for soliciting laboratories for analytical services and data validation.

6.0 QUALITY ASSURANCE AND QUALITY CONTROL REQUIREMENTS

The contracted laboratory must conduct its analyses with a quality assurance/quality control (QA/QC) Level 2 (QA-2). In order to ensure accurate data, the following measures are required:

1) Sample Documentation;
2) Chain of Custody;
3) Sample Holding Times;
4) Rinse & Field Blanks;
5) 5% Matrix Spike/Matrix Spike Duplicate;
6) Confirmation Analysis;
7) Initial & Continuing Instrument Calibration;
8) Performance Evaluation Sample(s);
9) Detection Limits;
10) Data Summary.

All analytical results are to be submitted by the laboratory to the Roy F. Weston, Inc. Analytical Coordinator. A verbal report will be submitted within twenty-one (21) calendar days of the date the laboratory received the samples for analysis and a written report within twenty-eight (28) days.

7.0 DELIVERABLES

A trip report will be prepared by the Project Manager highlighting the sampling activities and pertinent occurrences and delivered to the OSC within one week of the sampling event. Once the raw data has been received from the laboratory, an analytical package will be provided to the OSC.

8.0 DATA VALIDATION

All steps of data generation and handling will be evaluated by the On-Scene Coordinator (OSC), the Project Manager, and the Quality Assurance Officer for compliance with EPA Region II SOP for validating hazardous waste site data.

9.0 SYSTEM AUDIT

The Quality Assurance/Quality Control (QA/QC) Officer or a designated representative will observe the sampling operations and review subsequent analytical data to assure that the QA/QC project plan has been followed.

10.0 CORRECTIVE ACTIONS

All provisions will be taken in the field and laboratory to ensure that any problems that may develop will be dealt with as quickly as possible to ensure the continuity of the sampling program. Any deviations from this sampling plan will be noted in the final report.

APPENDIX A

1.0 SOIL SAMPLING: SOP #2012

1.1 SCOPE AND APPLICATION

The purpose of this Standard Operating Procedure (SOP) is to describe the procedures for collecting representative soil samples. Analysis of soil samples may determine whether concentrations of specific sod pollutants exceed established action levels, or if the concentrations of soil pollutants present a risk to public health, welfare, or the environment.

1.2 METHOD SUMMARY

Soil samples may be collected using a variety of methods and equipment. The methods and equipment used are dependent on the depth of the desired sample, the type of sample required (disturbed versus undisturbed), and the type of soil. Near-surface soils may be easily sampled using a spade, trowel, and scoop. Sampling at greater depths may be performed using a hand auger, a trier, a split-spoon, or, if required, a backhoe.

1.3 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

Chemical preservation of solids is not generally recommended. Refrigeration to 4°C, supplemented by a minimal holding time, is usually the best approach.

1.4 INTERFERENCES AND POTENTIAL PROBLEMS

There are two primary interferences or potential problems associated with soil sampling. These include cross-contamination of samples and improper sample collection. Cross-contamination problems can be eliminated or minimized through the use of dedicated sampling equipment. If this is not possible or practical, then decontamination of sampling equipment is necessary. Improper sample collection can involve using contaminated equipment, disturbance of the matrix resulting in compaction of the sample, or inadequate homogenization of the samples where required, resulting in variable, non-representative results.

1.5 EQUIPMENT/APPARATUS

- sampling plan
- maps/plot plan
- safety equipment, as specified in the health and safety plan
- compass
- tape measure
- survey stakes or flags
- camera and film
- stainless steel, plastic, or other appropriate homogenization bucket or bowl
- 1-quart mason jars w/Teflon liners
- Ziploc plastic bags
- logbook

- labels
- chain of custody forms and seals
- field data sheets
- cooler(s)
- ice
- decontamination supplies/equipment
- canvas or plastic sheet
- spade or shovel
- spatula
- scoop
- plastic or stainless steel spoons
- trowel
- continuous flight (screw) auger
- bucket auger
- post hole auger
- extension rods
- T-handle
- sampling trier
- thin-wall tube sampler
- Vehimeyer soil sampler outfit
  - tubes
  - points
  - drive head
  - drop hammer
  - puller jack and grip
- backhoe

1.6 REAGENTS

Reagents are not used for the preservation of soil samples. Decontamination solutions are specified in ERT SOP #2006, Sampling Equipment Decontamination.

1.7 PROCEDURES

1.7.1 Preparation

1. Determine the extent of the sampling effort, the sampling methods to be employed, and which equipment and supplies are required.

2. Obtain necessary sampling and monitoring equipment.

3. Decontaminate or preclean equipment, and ensure that it is in working order.

4. Prepare schedules, and coordinate with staff, client, and regulatory agencies, if appropriate.

5. Perform a general site survey prior to site entry in accordance with the site-specific health and safety plan.
6. Use stakes, buoys, or flagging to identify and mark all sampling locations. Consider specific site factors, including extent and nature of contaminant, when selecting sample location. If required, the proposed locations may be adjusted based on site access, property boundaries, and surface obstructions. All staked locations will be utility-cleared by the property owner prior to soil sampling.

1.7.2 Sample Collection

Sampling at Depth with Augers and Thin-Wall Tube Samplers

This system consists of an auger, a series of extensions, a "T" handle, and a thin-wall tube sampler (Appendix A, Figure 1). The auger is used to bore a hole to a desired sampling depth, and is then withdrawn. The sample may be collected directly from the auger. If a core sample is to be collected, the auger tip is then replaced with a thinwall tube sampler. The system is then lowered down the borehole, and driven into the soil at the completion depth. The system is withdrawn and the core collected from the thin-wall tube sampler.

Several types of augers are available. These include: bucket, continuous flight (screw), and posthole augers. Bucket augers are better for direct sample recovery since they provide a large volume of sample in a short time. When continuous flight augers are used, the sample can be collected directly from the flights, which are usually at 5-feet intervals. The continuous flight augers are satisfactory for use when a composite of the complete soil column is desired. Posthole augers have limited utility for sample collection as they are designed to cut through fibrous, rooted, swampy soil.

Follow these procedures for collecting soil samples with the auger and a thin-wall tube sampler.

1. Attach the auger bit to a drill rod extension, and attach the 'T" handle to the drill rod.

2. Clear the area to be sampled of any surface debris (e.g., twigs, rocks, litter). It may be advisable to remove the first 3 to 6 inches of surface soil for an area approximately 6 inches in radius around the drilling location.

3. Begin augering, periodically removing and depositing accumulated soils onto a plastic sheet spread near the hole. This prevents accidental brushing of loose material back down the borehole when removing the auger or adding drill rods. It also facilitates refilling the hole, and avoids possible contamination of the surrounding area.

4. After reaching the desired depth, slowly and carefully remove the auger from boring. When sampling directly from the auger, collect sample after the auger is removed from boring and proceed to Step 10.

5. Remove auger tip from drill rods and replace with a pre-cleaned thin-wall tube sampler. Install proper cutting tip.

6. Carefully lower the tube sampler down the borehole. Gradually force the tube sampler into the soil. Care should be taken to avoid scraping the borehole sides. Avoid hammering the drill rods to facilitate coring as the vibrations may cause the boring walls to collapse.

7. Remove the tube sampler, and unscrew the drill rods.

8. Remove the cutting tip and the core from the device.

9. Discard the top of the core (approximately 1 inch), as this represents material collected before penetration of the layer of concern. Place the remaining core into the appropriate labeled sample container(s). Sample homogenization is not required.

10. If volatile organic analysis is to be performed, transfer a portion of the sample directly into an appropriate, labeled sample container(s) with a stainless steel lab spoon, plastic lab spoon, or equivalent and secure the cap(s) tightly. Place the remainder of the sample into a stainless steel, plastic, or other appropriate homogenization container, and mix thoroughly to obtain a homogenous sample representative of the entire sampling interval. Then, either place the sample into an appropriate, labeled container(s) and secure the cap(s) tightly; or, if composite samples are to be collected, place a sample from another sampling interval into the homogenization container and mix thoroughly. When compositing is complete, place the sample into the appropriate, labeled container(s) and secure the cap(s) tightly.

11. If another sample is to be collected in the same hole, but at a greater depth, reattach the auger bit to the drill and assembly, and follow steps 3 through 11, making sure to decontaminate the auger and tube sampler between samples.

12. Abandon the hole according to applicable state regulations. Generally, shallow holes can simply be backfilled with the removed soil material.

Sampling at Depth with a Trier

The system consists of a trier, and a "T" handle. The auger is driven into the soil to be sampled and used to extract a core sample from the appropriate depth.

Follow these procedures to collect soil samples with a sampling trier.

1. Insert the trier (Appendix A, Figure 2) into the material to be sampled at a (0° to 45° angle from horizontal. This orientation minimizes the spillage of sample.

2. Rotate the trier once or twice to cut a core of material.

3. Slowly withdraw the trier, making sure that the slot is facing upward.

4. If volatile organic analysis is to be performed, transfer a portion of the sample directly into an appropriate, labeled sample container(s) with a stainless steel lab spoon, plastic lab spoon, or equivalent and secure the cap(s) tightly. Place the remainder of the sample into a stainless steel, plastic, or other appropriate homogenization container, and mix thoroughly to obtain a homogenous sample representative of the entire sampling interval. Then, either place the sample into an appropriate, labeled container(s) and secure the cap(s) tightly; or, if composite samples are to be collected, place a sample from another sampling interval into the homogenization container and mix thoroughly. When compositing is complete, place the sample into an appropriate, labeled container(s) and secure the cap(s) tightly.

Sampling at Depth with a Split Spoon (Barrel) Sampler

The procedure for split spoon sampling describes the collection and extraction of undisturbed soil cores of 18 or 24 inches in length. A series of consecutive cores may be extracted with a split spoon sampler to give a complete soil column profile, or an auger may be used to drill down to the desired depth for sampling. The split spoon is then driven to its sampling depth through the bottom of the augured hole and the core extracted.

When split tube sampling is performed to gain geologic information, all work should be performed in accordance with ASTM D 1586-67 (reapproved 1974).

Follow these procedures for collecting soil samples with a split spoon.

1. Assemble the sampler by aligning both sides of the barrel and then screwing the bit onto the bottom and the heavier head piece onto the top.

2. Place the sampler in a perpendicular position on the sample material.

3. Using a sledge hammer or well ring, if available, drive the tube. Do not drive past the bottom of the head piece or compression of the sample will result.
4. Record in the site logbook or on field data sheets the length of the tube used to penetrate the material being sampled, and the number of blows required to obtain this depth.

5. Withdraw the sampler, and open by unscrewing the bit and head and splitting the barrel. If a split sample is desired, a cleaned, stainless steel knife should be used to divide the tube contents in half, longitudinally. This sampler is typically available in diameters of 2 and 3 1/2 inches. However, in order to obtain the required sample volume, use of a larger barrel may be required.

6. Without disturbing the core, transfer it to an appropriate labeled sample container(s) and seal tightly.

1.8 CALCULATIONS

This section is not applicable to this SOP.

1.9 QUALITY ASSURANCE/ QUALITY CONTROL

There are no specific quality assurance activities which apply to the implementation of these procedures. However, the following OA procedures apply:

- All data must be documented on field data sheets or within site logbooks.

- All instrumentation must be operated in accordance with operating instructions as supplied by the manufacturer, unless otherwise specified in the work plan. Equipment checkout and calibration activities must occur prior t o sampling/operation, and they must be documented.

1.10 DATA VALIDATION

This section is not applicable to this SOP.

1.11 HEALTH AND SAFETY

When working with potentially hazardous materials, follow U.S. EPA, OSHA, and specific health and safety procedures.

APPENDIX B

1.0 SAMPLING EQUIPMENT DECONTAMINATION: SOP #2006

1.1 SCOPE AND APPLICATION

This Standard Operating Procedure (SOP) describes methods used for preventing or reducing cross-contamination, and provides general guidelines for sampling equipment decontamination procedures at a hazardous waste site. Preventing or minimizing cross-contamination in sampled media and in samples is important for preventing the introduction of error into sampling results and for protecting the health and safety of site personnel.

Removing or neutralizing contaminants that have accumulated on sampling equipment ensures protection of personnel from permeating substances, reduces or eliminated transfer of contaminants to clean areas, prevents the mixing of incompatible substances, and minimizes the likelihood of sample cross-contamination.

1.2 METHOD SUMMARY

Contaminants can be physically removed from equipment, or deactivated by sterilization or disinfection. Gross contamination of equipment requires physical decontamination, including abrasive and non-abrasive methods. These include the use of brushes, air and wet blasting, and high-pressure water cleaning, followed by a wash/rinse process using appropriate cleaning solutions. Use of a solvent rinse is required when organic contamination is present.

1.3 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

This section is not applicable to this SOP.

1.4 INTERFERENCES AND POTENTIAL PROBLEMS

- The use of distilled/deionized water commonly available from commercial vendors may be acceptable for decontamination of sampling equipment provided that it has been verified by laboratory analysis to be analyte free.

- An untreated potable water supply is not an acceptable substitute for tap water. Tap water may be used from any municipal water treatment system for mixing of decontamination solutions.

- Acids and solvents utilized in the decontamination sequence pose the health and safety risks of inhalation or skin contact, and raise shipping concerns of permeation or degradation.

- The site work plan must address disposal of the spent decontamination solutions.

- Several procedures can be established to minimize contact with waste an the potential for contamination. For example:

  - Stress work practices that minimize contact with hazardous substances.

  - Use remote sampling, handling, and container-opening techniques when appropriate.

  - Cover monitoring and sampling equipment with protective material to minimize contamination.

  - Use disposable outer garments and disposable sampling equipment when appropriate.

1.5 EQUIPMENT/APPARATUS

- appropriate personal protective clothing
- non-phosphate detergent
- selected solvents
- long-handled brushes
- drop cloths/plastic sheeting
- trash container
- paper towels
- galvanized tubs or buckets
- tap water
- distilled/deionized water
- metal/plastic containers for storage and disposal contaminated wash solutions
- pressurized sprayers for tap and deionized/distilled water
- sprayers for solvents
- trash bags
- aluminum foil
- safety glasses or splash shield
- emergency eyewash bottle

1.6 REAGENTS

There are no reagents used in this procedure aside from the actual decontamination solutions and solvents. In general, the following solvents are utilized for decontamination purposes:

- 10% nitric acid [1]
- acetone (pesticide grade) [2]
- hexane (pesticide grade) [2]
- methanol

[1] Only if sample is to analyzed for trace metals.
[2] Only if sample is to analyzed for organics.

1.7 PROCEDURES

As part of the health and safety plan, develop and set up a decontamination plan before any personnel or equipment enter the areas of potential exposure. The equipment decontamination plan should include:

- the number, location, and layout of decontamination stations
- which decontamination apparatus is needed
- the appropriate decontamination methods
- methods for disposal of contaminated clothing, apparatus, and solutions

1.7.1 Decontamination Methods

All personnel, samples, and equipment leaving the contaminated area of a site must be decontaminated. Various decontamination methods will either physically remove contaminants, inactive contaminants by disinfection or sterilization, or do both.

In many cases, gross contamination can be removed by physical means. The physical decontamination techniques appropriate for equipment decontamination can be grouped into tow categories: abrasive methods and non-abrasive methods.

Abrasive Cleaning Methods

Abrasive cleaning methods work by rubbing and wearing away the top layer of the surface containing the contaminant. The following methods are available:

- Mechanical: Mechanical cleaning method use brushes of metal or nylon. The amount and type of contaminants removed will vary with the hardness of bristles, length of brushing time, and degree of brush contact.

- Air Blasting: Air blasting is used for cleaning large equipment, such as bulldozers, drilling rigs or auger bits. The equipment used in air blast cleaning employs compressed air to force abrasive material through a nozzle at high velocities. the distance between the nozzle and the surface cleaned, as well as the pressure of air, the time of application, and the angle at which the abrasive strikes the surface, determines cleaning efficiency. Air blasting has several dis-advantages: it is unable to control the amount of material removed, it can aerate contaminants, and it generates large amounts of waste.

- Wet Blasting: Wet blast cleaning, also used to clean large equipment, involves use of a suspended fine abrasive delivered by compressed air to the contaminated area. The amount of materials removed can be carefully controlled by using very fine abrasives. This method generates a large amount of waste.

Non-Abrasive Cleaning Methods

Non-abrasive cleaning methods work by forcing the contaminant off of a surface with pressure. In general, less of the equipment surface is removed using non-abrasive methods. The following non-abrasive methods are available:

- High-Pressure Water: This method consists of a high-pressure pump, an operator-controlled directional nozzle, and a high-pressure hose. Operating pressure usually ranges from 340 to 680 atmospheres (atm) which related to flow rate of 20 to 140 liters per minute.

- Ultra-High-Pressure Water: This system produces a pressurized water jet (from 1,000 to 4,000 atm). the ultra-high-pressure spray removes tightly-adhered surface film. The water velocity ranges from 500 m/sec (1,000 atm) to 900 m/sec (4,000 atm). Additives can enhance the method. this method is not applicable for hand-held sampling equipment.

Disinfection/Rinse Methods

- Disinfection: Disinfectants are a practical means of inactivating infectious agents.

- Sterilization: Standard sterilization methods involve heating the equipment. Sterilization is impractical for large equipment.

- Rinsing: Rinsing removes contaminants through dilution, physical attraction, and solubilization.

1.7.2 Field Sampling Equipment Cleaning Procedures

Solvent rinses are not necessarily required when organics are not a contaminant of concern and may eliminated from the sequence specified below. Similarly, an acid rinse is not required if analysis does not include inorganics.

1. Where applicable, follow physical removal procedures specified in section 1.7.1.

2. Wash equipment with a non-phosphate detergent solution.

3. Rinse with tap water.

4. Rinse with distilled/deionized water.

5. Rinse with 10% nitric acid if the sample will be analyzed for trace metals.

6. Rinse with distilled/deionized water.

7. Use a solvent rinse (pesticide grade) if the sample will be analyzed for organics.

8. Air dry the equipment completely.

9. Rinse again with distilled/deionized water.

Selection of the solvent for use in the decontamination process is based on the contaminant present at the site. Use of a solvent is required when organic contamination is present on-site. Typical solvents used for removal of organic contaminants include acetone, hexane, or water. An acid rinse step is required if metals are present on site. If a particular contaminant fraction is not present at the site, the nine-step decontamination procedure listed above may be modified for site specificity. The decontamination solvent used should not be among the contaminants of concern at the site.

Table 1 lists solvent rinses which may be required for elimination of particular chemicals. After each solvent rinse, the equipment should be air dried and rinsed with distilled/deionized water.

Sampling equipment that required the use of plastic tubing should be disassembled and the tubing replaced with clean tubing, before commencement of sampling and between sampling locations.

1.8 CALCULATIONS

This section is not applicable to this SOP.

1.9 QUALITY ASSURANCE/QUALITY CONTROL

One type of quality control sample specific to the field decontamination process is the rinsate blank. The rinsate blank provides information on the effectiveness of the decontamination process employed in the field. When used in conjunction with field blanks and trip blanks, a rinsate blank can detect contamination during sample handling, storage and sample transportation to the laboratory.

Table 1: Recommended Solvent Rinse for Soluble Contaminants

SOLVENT	SOLUBLE CONTAMINANTS
Water	• Low-chain hydrocarbons • Inorganic compounds • Salts • Some organic acids and other polar compounds
Dilute Acids	• Basic (caustic) compounds • Amines • Hydrazines
Dilute Bases--for example, detergent and soap	• Metals • Acidic compounds • Phenol • Thiols • Some nitro and sulfonic compounds
Organic Solvents (1) - for example, alcohols, ethers, ketones, aromatics, straight-chain alkanes (e.g., hexane), and common petroleum products (e.g.,fuel, oil, kerosene)	• Nonpolar compounds (e.g., some organic compounds)

(1)- WARNING: Some organic solvents can permeate and/or degrade protective clothing.

A rinsate blank consists of a sample of analyte-free (i.e., deionized) water which is passed over and through a field decontaminated sampling device and placed in a clean sample container.

Rinsate blanks should be run for all parameters of interest at a rate of 1 per 20 for each parameter, even if samples are not shipped that day. Rinsate blanks are not required if dedicated sampling equipment is used.

1.10 DATA VALIDATION

This section is not applicable to this SOP.

1.11 HEALTH AND SAFETY

When working with potentially hazardous materials, follow U.S. EPA, OSHA and specific health and safety procedures.

Decontamination can pose hazards under certain circumstances even though performed to protect health and safety. Hazardous substances may be incompatible with decontamination methods. For example, the decontamination solution or solvent may react with contaminants to produce heat, explosion, or toxic products. Decontamination methods may be incompatible with clothing or equipment; some solvents can permeate or degrade protective clothing. Also, decontamination solution and solvents may pose a direct health hazard to workers through inhalation or skin contact, or if they combust.

The decontamination solutions and solvents must be determined to be compatible before use. Any method that permeates, degrades, or damages personal protective equipment should not be used. If decontamination methods pose a direct health hazard, measures should be taken to protect personnel or the methods should be modified to eliminate the hazard.

Figure 1

The data generated from this sampling and analyses project will be used for the disposal of the eight ash piles and the three roll-offs. In addition, the data will be used to determine if the soils in the rear of the site are contaminated with dioxin.

3.0 QUALITY ASSURANCE OBJECTIVES

As identified in Sections 1.0 and 2.0, the objective of the project/event applies to the following parameters:

Sample Parameter/Fraction	Analytical Method Reference	Holding Time	Volume
TCL			
PCB	SW-8080	7 days	1 X 8 oz.
PCDD/PCDF	SW-8280	30 days	2 X 8 oz.

NOTE:
1. Sample matrix is soil/ash (low/med concentration)
2. Sample preparation method for TCL fraction is SW-3510/3540
3. Sample preservation is cool to 4C
4. Sample QA/QC objective is level 2
5. Limit of detection is analyte-specific
6. Holding time is determined from collection date to extraction

4.0 SAMPLING APPROACH & METHODOLOGIES

4.1 Sampling Design

The ERCS contractor's confirmation soil/ash samples will consist of one five-point composite sample collected from each of the three ash piles determined by ERCS to contain the highest levels of dioxin, one three-point composite sample from each of the three 30-cubic yard roll-offs staged in front of building #2, and four soil samples from the rear drum pile area. All samples will be surficial, 0-6 inches in depth. The ash sample locations will correspond to prior ERCS contractor's sampling with the soil samples, located along a diagonal transect through the former drum pile area. All samples will be excavated using disposable plastic scoops. The samples will be homogenized in disposable aluminum baking pans. The representative sample collected from the resulting mixed volume will be analyzed for PCBs, PCDDs, and PCDFs.

Eleven soil/ash samples, including one field duplicate will be collected from the ash piles, roll-offs, and former drum pile area. Sample volumes per analysis will be two

8-oz. glass jars for PCDD and PCDF, and one 8-oz. glass jar for PCB. Triple volume will be collected at one location to include Matrix spike/matrix spike duplicate (MS/MSD) samples. In addition, one set of performance evaluation samples (PES) will be submitted for PCDD and PCDF analyses (See Section 6.2).

A summary of the samples to be taken is as follows:

Sample Type	Dioxin Analysis	PCB Analysis
Soil/Ash sample(s)	10	10
Field Duplicate(s)	1	1
Field Blank(s)	-	-
Rinsate Blank(s)	-	-
MS/MSD Sample(s)	1	1
PE Sample Set(s)	1	1
TOTAL:	13	13

include court yard 1-comp.

4.2 Sampling Equipment

Sample containers will be specially cleaned laboratory glassware, as directed under OSWER Directive 9240.0-05: Specifications and Guidance for Obtaining Contaminant-Free Sample Containers (July 1989). The outside of the sample jars will be wiped clean using plain paper towels to prevent possible spread of contamination beyond the decontamination zone.

All ash and surface soil samples will be collected using disposable plastic scoops and aluminum baking pans. Decontamination procedures will therefore not be necessary.

4.3 Standard Operating Procedures

4.3.1 Sample Documentation

All sampling information will be completed legibly and in ink. Any mistakes that are made will be denoted by a single line to cross out the mistake and the initials of the transcriber.

4.3.1.1 FIELD LOG BOOK

The field log book details site activities and observations such that it can account for field procedures and pertinent information in the transcriber's absence. All entries will be dated and signed by the transcriber and will be maintained by the sampling contractor. The following information will be recorded:

1. Site name and project number;
2. Name(s) of personnel on site;
3. Dates and times of all entries (military time);

4. Descriptions of all site activities, including site entry and exit times, noteworthy events and discussions, site observations;
5. Weather conditions;
6. Identification and description of samples and locations;
7. Subcontractor information and names of on site personnel;
8. Date and time of sample collections, along with chain of custody information;
9. Sample locations, sampling equipment and other equipment used to make field measurements;
10. Calibration data for equipment;
11. Calculations and results;
12. Record of photographs;
13. Site sketches.

4.3.1.2 SAMPLE LABELS

Each sample will be accurately and completely identified. All labels will be moisture-resistant and able to withstand field conditions. Sample containers will be labeled prior to sample collection. The information on each label will include, but is not limited to, the following, but is not limited to:

1) Date/time of collection;
2) Sample identity/location;
3) Analysis requested;
4) Sample type (composite);
5) Sample preservation (if required).

4.3.1.3 CHAIN OF CUSTODY RECORD

EPA chain of custody records will be completed and maintained throughout the entire site activities as per TAT Standard Operating Procedures (SOP) on sample handling, sample container contract specifications, and EPA Laboratory's SOP. The chain of custody form to be used lists the following information:

1) Sample number;
2) Number of sample containers;
3) Description of samples including specific location of sample collection;
4) Identity of person collecting the sample;
5) Date and time of sample collection;

6) Date and time of custody transfer to laboratory (if the sample was collected by a person other than laboratory personnel);
7) Identity of person accepting custody (if the sample was collected by a person other than the laboratory personnel);
8) Identity of laboratory performing the analysis.

4.3.1.4 CHAIN OF CUSTODY SEALS

Chain of Custody Seals demonstrate that a sample container has not been tampered with or opened.

The individual packaging the sample(s) must sign and date the seal, affixing it in such a manner that the container cannot be opened without breaking the seal. The name of this individual, along with a description of the sample packaging, must be noted in the Field Log Book.

4.3.2 SOIL SAMPLING SOP

Collection of surface soil samples will be accomplished with disposable plastic scoops. Prior to the collection of the sample, surface debris will be removed with a sterile sampling tool.

As with all samples (both surficial and at depth), the soil will be removed from the sample location and homogenized in an aluminum baking pan. A representative sample will be collected and transferred into an appropriately labelled sample container. (See Appendix A for further reference.)

4.3.3 Sample Handling and Shipment SOP

After a sample has been collected, the sample bottle will be capped and affixed with a custody seal. Each sample will be labelled with the appropriate information (including sample number, date and time of collection, analysis requested and preservative used). All of the samples will be packaged and shipped according to the proper DOT shipping regulations.

4.4 Schedule of Activities

Sample collection is tentatively scheduled for the week of August 7, 1995. An exact date will be determined once the laboratory has been determined.

5.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

The EPA On-Scene Coordinator (OSC), Joe Cosentino, or his designated alternate will provide the Region II TAT direction concerning project sampling needs, objectives, and schedules.

The TAT Project Manager, Heidemarie Adenau, is the primary point of contact with the EPA OSC. The project manager is responsible for the development and completion of the Sampling QA/QC Plan, project team organization, and supervision of all project tasks, including reporting and deliverables.

The TAT Sample Management Officer/Site QC Coordinator (to be determined) is responsible for ensuring field adherence to the Sampling QA/QC Plan and recording any deviations from the plan.

The TAT Analytical Coordinator, Smita Sumbaly, is responsible for soliciting laboratories for analytical services and data validation.

6.0 QUALITY ASSURANCE AND QUALITY CONTROL REQUIREMENTS

The contracted laboratory must conduct its analyses with a quality assurance/quality control (QA/QC) Level 2 (QA-2). In order to ensure accurate data, the following measures are required:

1) Sample documentation;
2) Chain of custody;
3) Sample holding times;
4) Rinse & field blanks;
5) 10% Matrix Spike/Matrix Spike Duplicate;
6) Confirmation analysis;
7) Initial & continuing instrument calibration;
8) PES(s)
9) Detection limits;
10) Data summary.

<u>PCDD/PCDF Analysis:</u>

1) One matrix spike analysis will be performed on one sample in each set of 20 environmental samples collected.

2) One duplicated sample analysis will be performed for each set of 20 environmental samples collected.

3) Analysis of one set of PES(s) will be performed for each set of 20 environmental samples collected. PES(s) from the Superfund PES Repository will be ordered by the OSC from the <u>1995 Superfund Performance Evaluation Sample</u> catalog and shipped directly to the laboratory with the appropriate blind inventory sample labels.

   a) One sample fortified with 2,3,7,8-TCDD isomers.
   b) One sample fortified with 2,3,7,8-substituted isomers.
   c) One blank soil, analyzed by EMSL-LV and determined to be free of dioxin or furan congeners.

4) The contracted laboratory will furnish the following deliverables as warranted:

   a) GC tuning and calibration standards;

   b) Copies of all spectral data obtained during performance of analysis. Copies should be signed by the analyst and checked by the laboratory manager;

   c) The detection limit will be determined and recorded, along with the data, where appropriate; detection limits must meet the specified limits provided in Appendix A.

   d) Data system printout (quantitation report or legible facsimile GC);

   e) Manual work sheets;

   f) Identification and explanation of any analytical modifications that differ from U.S. EPA protocol.

All analytical results are to be submitted by the laboratory to the Region II TAT Analytical Coordinator. A written report will be submitted within 28 calendar days of the date the laboratory received the samples for PCDD/PCDF analysis.

7.0 DELIVERABLES

A trip report will be prepared by the Project Manager highlighting the sampling activities and pertinent occurrences and delivered to the OSC within one week of the sampling event. Once the raw data has been received from the laboratory, an analytical package will be provided to the OSC.

8.0 DATA VALIDATION

All steps of data generation and handling will be evaluated by the OSC the Project Manager, and the Quality Assurance Officer for compliance with EPA Region II SOP for validating hazardous waste site data.

9.0 SYSTEM AUDIT

The Quality Assurance/Quality Control (QA/QC) Officer or a designated representative will observe the sampling operations and review subsequent analytical data to assure that the QA/QC project plan has been followed.

10.0 CORRECTIVE ACTIONS

All provisions will be taken in the field and laboratory to ensure that any problems that may develop will be dealt with as quickly as possible to ensure the continuity of the sampling program. Any deviations from this sampling plan will be noted in the final report.

APPENDIX A

1.0 SOIL SAMPLING: SOP #2012

1.1 SCOPE AND APPLICATION

The purpose of this Standard Operating Procedure (SOP) is to describe the procedures for collecting representative soil samples. Analysis of soil samples may determine whether concentrations of specific sod pollutants exceed established action levels, or if the concentrations of soil pollutants present a risk to public health, welfare, or the environment.

1.2 METHOD SUMMARY

Soil samples may be collected using a variety of methods and equipment. The methods and equipment used are dependent on the depth of the desired sample, the type of sample required (disturbed versus undisturbed), and the type of soil. Near-surface soils may be easily sampled using a spade, trowel, and scoop. Sampling at greater depths may be performed using a hand auger, a trier, a split-spoon, or, if required, a backhoe.

1.3 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

Chemical preservation of solids is not generally recommended. Refrigeration to 4°C, supplemented by a minimal holding time, is usually the best approach.

1.4 INTERFERENCES AND POTENTIAL PROBLEMS

There are two primary interferences or potential problems associated with soil sampling. These include cross-contamination of samples and improper sample collection. Cross-contamination problems can be eliminated or minimized through the use of dedicated sampling equipment. If this is not possible or practical, then decontamination of sampling equipment is necessary. Improper sample collection can involve using contaminated equipment, disturbance of the matrix resulting in compaction of the sample, or inadequate homogenization of the samples where required, resulting in variable, non-representative results.

1.5 EQUIPMENT/APPARATUS

- sampling plan
- maps/plot plan
- safety equipment, as specified in the health and safety plan
- compass
- tape measure
- survey stakes or flags
- camera and film
- stainless steel, plastic, or other appropriate homogenization bucket or bowl
- 1-quart mason jars w/Teflon liners
- Ziploc plastic bags
- logbook

1.5 EQUIPMENT/APPARATUS (cont.)

- labels
- chain of custody forms and seals
- field data sheets
- cooler(s)
- ice
- decontamination supplies/equipment
- canvas or plastic sheet
- spade or shovel
- spatula
- scoop
- plastic or stainless steel spoons
- trowel
- continuous flight (screw) auger
- bucket auger
- post hole auger
- extension rods
- T-handle
- sampling trier
- thin-wall tube sampler
- Vehimeyer soil sampler outfit
  - tubes
  - points
  - drive head
  - drop hammer
  - puller jack and grip
- backhoe

1.6 REAGENTS

Reagents are not used for the preservation of soil samples. Decontamination solutions are specified in ERT SOP #2006, Sampling Equipment Decontamination.

1.7 PROCEDURES

1.7.1 Preparation

1. Determine the extent of the sampling effort, the sampling methods to be employed, and which equipment and supplies are required.

2. Obtain necessary sampling and monitoring equipment.

3. Decontaminate or preclean equipment, and ensure that it is in working order.

4. Prepare schedules, and coordinate with staff, client, and regulatory agencies, if appropriate.

5. Perform a general site survey prior to site entry in accordance with the site-specific health and safety plan.
6. Use stakes, buoys, or flagging to identify and mark all sampling locations. Consider specific site factors, including extent and nature of contaminant, when selecting sample location. If required, the proposed locations may be adjusted based on site access, property boundaries, and surface obstructions. All staked locations will be utility-cleared by the property owner prior to soil sampling.

1.7.2 Sample Collection

Surface Soil Samples

Collect samples from near-surface soil with tools such as spades, shovels, and scoops. Surface material can be removed to the required depth with this equipment, then a stainless steel or plastic scoop can be used to collect the sample.

This method can be used in most soil types but is limited to sampling near surface areas. Accurate, representative samples can be collected with this procedure depending on the care and precision demonstrated by the sampling team member. The use of a flat, pointed mason trowel to cut a block of the desired soil can be helpful when undisturbed profiles are required. A stainless steel scoop, lab spoon, or plastic spoon will suffice in most other applications. Avoid the use of devices plated with chrome or other materials. Plating is particularly common with garden implements such as potting trowels.

Follow these procedures to collect surface soil samples.

1. Carefully remove the top layer of soil or debris to the desired sample depth with a precleaned spade.

2. Using a pre-cleaned, stainless steel scoop, plastic spoon, or trowel, remove and discard a thin layer of soil from the area which came in contact with the spade.

3. If volatile organic analysis is to be performed, transfer a portion of the sample directly into an appropriate, labeled sample container(s) with a stainless steel lab spoon, plastic lab spoon, or equivalent and secure the cap(s) tightly. Place the remainder of the sample into a stainless steel, plastic, or other appropriate homogenization container, and mix thoroughly to obtain a homogenous sample representative of the entire sampling interval. Then, either place the sample into an appropriate, labeled container(s) and secure the cap(s) tightly; or, if composite samples are to be collected, place a sample from another sampling

interval into the homogenization container and mix thoroughly. When compositing is complete, place the sample into appropriate, labeled container(s) and secure the cap(s) tightly.

1.8 CALCULATIONS

This section is not applicable to this SOP.

1.9 QUALITY ASSURANCE/ QUALITY CONTROL

There are no specific quality assurance activities which apply to the implementation of these procedures. However, the following QA procedures apply:

- All data must be documented on field data sheets or within site logbooks.

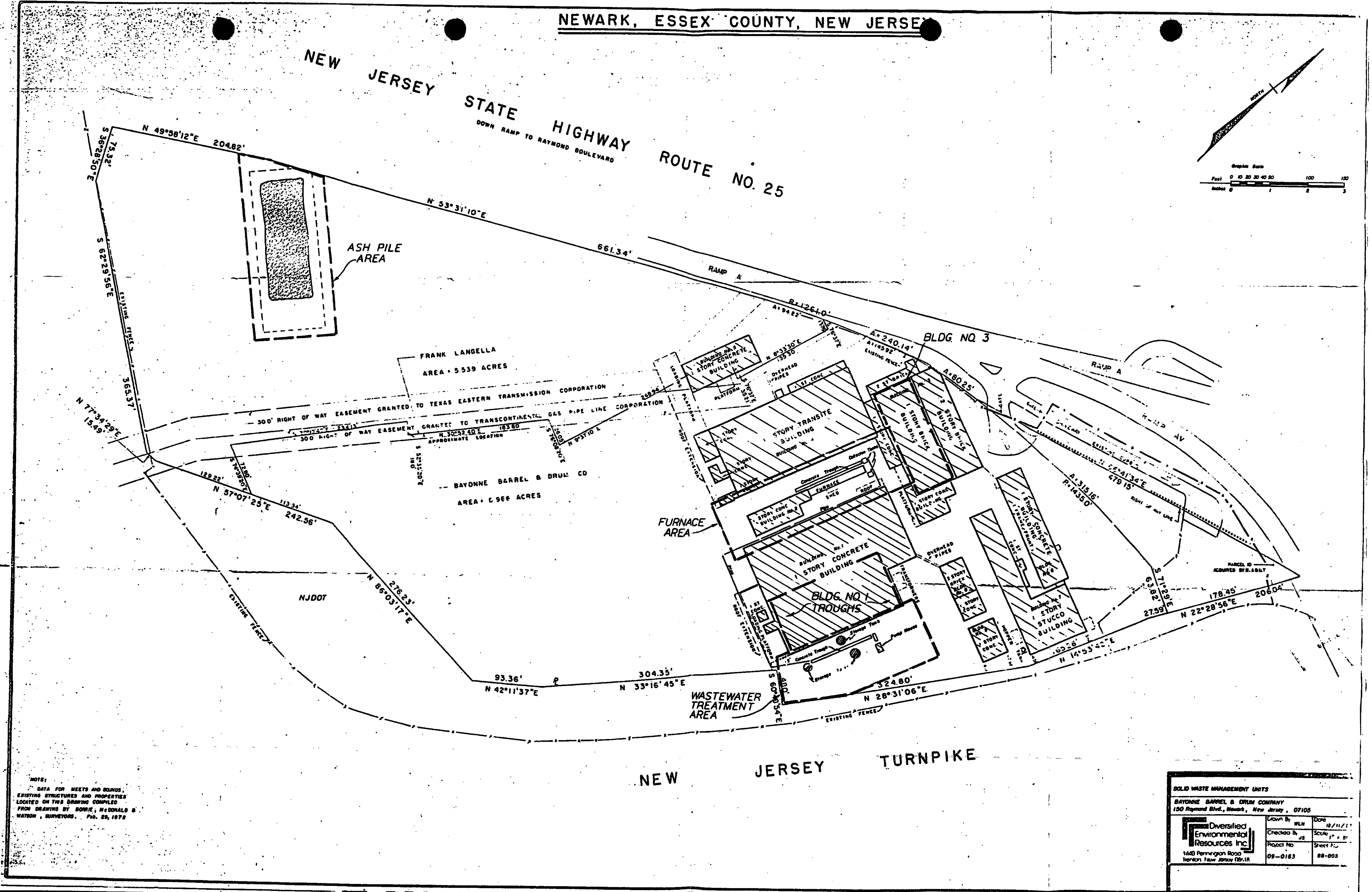
- All instrumentation must be operated in accordance with operating instructions as supplied by the manufacturer, unless otherwise specified in the work plan. Equipment checkout and calibration activities must occur prior t o sampling/operation, and they must be documented.

1.10 DATA VALIDATION

This section is not applicable to this SOP.

1.11 HEALTH AND SAFETY

When working with potentially hazardous materials, follow U.S. EPA, OSHA, and specific health and safety procedures.


NEWARK, ESSEX COUNTY, NEW JERSEY
NEW JERSEY STATE HIGHWAY ROUTE NO. 25
DOWN RAMP TO RAYMOND BOULEVARD
NORTH
ASH PILE AREA
FRANK LANGELLA
AREA = 5.539 ACRES
300' RIGHT OF WAY EASEMENT GRANTED TO TEXAS EASTERN TRANSMISSION CORPORATION
300' RIGHT OF WAY EASEMENT GRANTED TO TRANSCONTINENTAL GAS PIPE LINE CORPORATION
APPROXIMATE LOCATION
BAYONNE BARREL & DRUM CO
AREA = 6.966 ACRES
NJDOT
EXISTING FENCE
RAMP A
BLDG. NO. 3
1 STORY TRANSITE BUILDING
1 STORY CONCRETE BUILDING
1 STORY BRICK BUILDING
2 STORY BRICK BUILDING
FURNACE AREA
BLDG. NO. 1 TROUGHS
1 STORY STUCCO BUILDING
OVERHEAD PIPES
Storage Tank
Pump House
Concrete Trough
WASTEWATER TREATMENT AREA
N 49°58'12"E 204.82'
N 53°31'10"E 661.34'
S 62°29'56"E
365.37'
N 77°34'29"E 15.49'
N 57°07'25"E 242.56'
N 86°03'17"E 276.23'
N 42°11'37"E 93.36'
N 33°16'45"E 304.35'
N 28°31'06"E 324.80'
N 22°28'56"E 178.45' 206.04'
N 14°53'42"E
S 71°29'E
R=1261.0'
A=240.14'
A=80.25'
A=315.16'
R=1435.0'
479.15'
RIGHT OF WAY LINE
PARCEL 10 ACQUIRED BY N.J.D.O.T.
NEW JERSEY TURNPIKE
NOTE:
DATA FOR MEETS AND BOUNDS, EXISTING STRUCTURES AND PROPERTIES LOCATED ON THIS DRAWING COMPILED FROM DRAWING BY BORRIE, McDONALD & WATSON, SURVEYORS. Feb. 29, 1972
SOLID WASTE MANAGEMENT UNITS
BAYONNE BARREL & DRUM COMPANY
150 Raymond Blvd., Newark, New Jersey, 07105
Diversified Environmental Resources Inc.
1440 Pennington Road
Trenton, New Jersey 08618
Drawn By WLH
Date 12/11/8?
Checked By JS
Scale 1" = 50'
Project No 09-0183
Sheet No 88-003